puncture later showed a normal fluid. Two sequestræ were subsequently removed, the discharge ceased, the cavity epidermitized, and the patient was discharged well.

Case II. Otorrhœa from the right ear since infancy. Acute mastoiditis supervening, a petromastoid exenteration was performed. Eight days later there was acute general meningitis; the brain was then exposed and the exposure followed by incision of the dura mater and cerebral puncture. Four lumbar punctures were made within ten days; at each puncture ten to fifteen cubic centimetres of fluid were removed, which removal lessened the intense headaches and the stiffness of the neck. The pupils were unequal throughout the course of the disease.

Clinically, and by cytological examination of the cerebrospinal fluid, both of these cases were proven to be cases of purulent meningitis.

The writers conclude that the only complication of suppurative otitis which has baffled the surgeon, that is, purulent meningitis, may in the future be operated upon as successfully as the surgeon now operates in cases of brain abscess and sinus thrombosis. Four rules for the surgical treatment of purulent meningitis of otitic origin are then given, with detailed description.

Rule 1. Make a large opening of the middle ear and uncover the dura mater without going through it.

Rule 2. In case of failure of the preceding intervention, but in this case only, go through the dura mater in order to penetrate the subarachnoid space.

Rule 3. Practice and systematically repeat lumbar puncture.

Rule 4. Respect the labyrinth.

Practical Deductions from Our Recent Knowledge of Suppuration of the Labyrinth.—DUNDAS GRANT (*Annales des mal. de l'oreille, du larynx*, etc., tome xxx., No. 10) is of the opinion that many cases of suppuration of the labyrinth have no doubt been overlooked, because they have not been thought of or not looked for. It is a new surgical field; Jansen and Brieger have shown the frequence of labyrinthitis as a cause of otitic meningitis, and Jansen, Okada, and Whitehead have evidenced its frequency as a cause of cerebellar abscess. Jansen found labyrinthitis in from 20 per cent. to 25 per cent. of his cases of radical operation on the mastoid.

Prognosis. When the petromastoid exenteration alone has been done the mortality has been about 50 per cent., but with operation upon the labyrinth also the mortality has been reduced to 20 per cent.

Besides meningitis, cerebellar abscess is another important cause of death in labyrinthine suppurations (12 per cent. to 33 per cent.), and a practical deduction to be drawn is that in cases of cerebellar abscess a labyrinth lesion, and not always a lesion of the sinus, may serve to explain the cause of the abscess.

To prevent labyrinthine suppuration especial care in the treatment of middle-ear suppurations, acute as well as chronic, should be taken. The longer they have been without treatment, the greater the chance of labyrinthine affection, and careful note should be taken in the course of middle-ear suppuration of increase of deafness, of decreased osseous perception, of disturbances of equilibrium, or of positive vertigo, especially when associated with nystagmus, headache, and vomiting. During mastoid operations the external surface of the labyrinth should be carefully examined for local signs of labyrinthitis, to which end it is necessary to use powerful electric illumination, and hydrogen peroxide or adrenalin to stop bleeding; as much as possible of the posterior bony wall of the auditory canal should be taken away, and a rotating burr preferably employed to diminish concussion, especially in removing the hard external wall of the attic. The gouges used should be sharp and always directed obliquely to the bone. In a small number of cases it is impossible to introduce Stacke's protector between the posterior auditory canal and the external semicircular canal.

Early Diagnosis. (*a*) Before operation study the disturbances of equilibrium, which are more marked when the head is turned toward the diseased side; also nystagmus, which often only exists when the eyes are turned toward the well side. Make hearing tests with great care, Weber's test being often misleading in cases of labyrinthine disease. (*b*) During the operation examine carefully the external semicircular canal, the oval window, the round window, and that part of the cochlea at the level of the promontory; remove completely the external wall of the attic and the "spur." (*c*) After mastoid operation labyrinthine suppuration is to be suspected if headache, fever, vertigo, vomiting, or nystagmus persist, or appear. Note the similarity between symptoms of labyrinthine suppuration and those of cerebellar abscess, the points of difference most marked being in cerebellar abscess, slow pulse and respiration, low temperature, tendency to coma and drowsiness, cerebral torpor, constipation, and wasting. Disturbances of equilibrium are rare in cerebellar abscess, but very constant in the acute stage of labyrinthitis. The gait in cerebellar affections is comparable to that of a drunken man, while in labyrinthitis there is more subjective feeling of vertigo and a gait which Moos compares to that of a duck. The two affections may coexist; in fact, in half the cases of cerebellar abscess there is suppurative labyrinthitis also. Suppurative labyrinthitis may be latent; cerebellar abscess may have a long latent period.

Indications for Operation. In general, if there is pus in the labyrinth; severe labyrinthine symptoms unaccounted for or unrelieved by mastoid operation; presence, or threatening, of symptoms of meningitis, cerebral abscess, cerebellar abscess or extradural abscess traceable to labyrinthine suppuration; if fistulæ and local signs of suppuration are found, in general if pus oozes, especially if it reappears after being wiped away.

Remarks. Evacuation of the labyrinth, unless necessary, adds to the risk of the operation. Suppuration is often limited to the external semicircular canal, a condition in which operation frequently leads to recovery. Inflammatory connective tissue in the internal auditory canal may prevent the suppuration from extending to the meninges. Nerve deafness may be due to a non-suppurative inflammatory lesion of the labyrinth. The openings of minute cells on the inner wall of the antrum should not be mistaken for fistulæ of the semicircular canal.

Operation. The best instrument, in the opinion of the author, is the rotating burr. Jansen, however, prefers the small chisels, 1½ to 3½ mm. in size. Sometimes it is impossible to avoid injuring the facial nerve. After opening the external semicircular canal the opening can be extended forward without difficulty into the vestibule. The burr may be used to enlarge the oval window inferiorly, and the cochlea may be opened with a very small burr in front of the round window.